The claims require a chemical bond between the abrasive grain and the core or tool substrate. Most conventional brazes chemically bond to the core but not to the abrasive grain. Only "active" or "reactive" brazes chemically bond to both the grain and the substrate. Applicants' position with respect to the differences among the invention tools and the prior art tools is the following (-- denotes a chemical bond; X denotes no chemical bond) :

1) Invention: Core--Braze--Abrasive Grain

2) Conventional Brazed SL Tool : Core--Braze X Abrasive Grain

3) Asada Electroplated Tool : Core X Metal Bond X Abrasive Grain

4) Scott Brazed Mesh Tool : Mesh--Braze X Abrasive Grain.

Only the invention provides a chemical bond among all three elements. Because hard ceramic materials have surfaces that are notoriously difficult to "wet", a mechanical coating with a metal--either brazed or electroplated--on diamond or CBN is quite a weak bond.

The Applicants' position is reflected in paragraph 3 of the Buljan declaration where he states an electroplated tool is inferior in a grinding performance test to a "brazed single layer tool made with a bronze braze that is chemically bonded to the diamond abrasive." In paragraphs 4 and 5, Buljan gives his opinion as an expert in this technology that cutting tools made with an active braze in place of an electroplated bond would exhibit the same types of performance improvements in tool life and tool wear as did the grinding tools he had tested. His opinion is based on the differences in strength and durability of the mechanical bond to the grain formed in electroplating versus a chemical bond to the grain formed with an active braze.

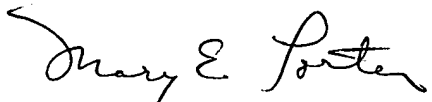
To chemically bond diamond or CBN abrasive grain to a metallic substrate surface, the bonding agent is preferably an active braze or other composition comprising an element reactive with the carbon or the nitride on the surface of the grain to form a carbide or nitride compound. For example, the preferred reactive braze used in the invention may contain a nickel-chromium material, or a bronze-titanium material. (See page 19, lines 9-17.) Under appropriate brazing conditions known to those skilled in the art, the titanium forms titanium carbide material at the surface of the diamond grain, thus creating a chemical bond to the braze and the substrate. In addition, the grain may be coated (physically or chemically) with a material such as titanium or tungsten which also chemically bonds the abrasive grain to the components of the braze under brazing conditions (See page 19, lines 20-22).

For these reasons, Applicants' claims require a chemical bond between the abrasive grain and the tool, in additional to all other elements of the claimed invention. The claimed tool made with chemically bonded abrasive grain is neither disclosed nor suggested in the cited art.

CONCLUSION

In view of the remarks submitted herein, Applicants respectfully request reconsideration of the rejection and an allowance of the claims.

Respectfully submitted,



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